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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/816,585	03/31/2004	William H. Whitted	16113-1322001	8421
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EXAMINER				
PAPE, ZACHARY				
ART UNIT		PAPER NUMBER		
2835				
NOTIFICATION DATE		DELIVERY MODE		
09/25/2009		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

### Office Action Summary

**Application No.**

10/816,585

**Applicant(s)**

WHITTED, WILLIAM H.

**Examiner**

ZACHARY M. PAPE

**Art Unit**

2835

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 September 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 34-39 and 41-56 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 34-39 and 41-56 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 May 2009 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB08)
- Paper No(s)/Mail Date 9/14/2009.

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date: \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/14/2009 has been entered.

***Information Disclosure Statement***

2. The information disclosure statement filed 9/14/2009 has been fully considered and is attached hereto.

***Drawings***

3. The objection to the drawings has been withdrawn in view of the newly filed figure 2a.

***Claim Rejections - 35 USC § 112***

4. The 112 rejections to claim 40 has been withdrawn in view of the cancellation thereof.

***Response to Arguments***

5. Applicant's arguments with respect to claims 34-39, 41-55 have been considered but are moot in view of the new ground(s) of rejection below.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 34-36, 38-39, 43-45, 49-50, 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al. (US 2004/0100770 – hereinafter, "Chu", already of record) in view of Beitelmal et al. (US 2003/0053293 – hereinafter, "Beitelmal", already of record) and further in view of Dearborn et al. (US 2002/0190868 – hereinafter, "Dearborn").

With respect to claims 34 and 43, Chu teaches (In Figs 11a-11b) a system for cooling electronic components, comprising: a rack structure (Generally depicted in Fig 11b) holding a plurality of computer boards that support heat-generating computer components (12, [0002-0006], and [0040]), the rack structure having open first and second sides (Best illustrated in Fig 11b); permitting fluid communication across the computer boards to an exterior of the rack structure (See Figs 11a-11b); a plurality of air circulation fans (11) adjacent one of the first or second sides, wherein each of the circulation fans is located near an edge of one of the computer boards and positioned to

circulate cooling air across an associated board, wherein the air circulation fans provide cooling air over the computer boards; wherein cooling air circulated over a first computer board is separate from cooling air circulated over a second computer board adjacent the first computer board (See Fig 11b wherein a single fan 11 is dedicated to a single board in a single container (13) as shown); one or more cooling coils (21) associated with each of the plurality of boards and located near one of the first or second sides of the rack structure (See Fig 5a). Chu fails to teach or suggest a fan controller corresponding to each air circulation fan to control the speed of the corresponding fan according to a temperature sensed around a board corresponding to the air circulation fan and that the rack structure is one of a plurality of rack structures arranged to form a pair of rows on each side of a central aisle, the plurality of computer boards accessible through at least one of the open first and second sides through the central aisle. Beitelmal teaches a fan controller(s) (50) corresponding to an air circulation fan(s) (14) to control the speed of the corresponding fan according to a temperature sensed around a board corresponding to the air circulation fan [0031, 0033]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Beitelmal as per above with that of Chu to provide the ability to increase or decrease the flow rate of cooling fluid [0033]. Increasing or decreasing the fluid rate will allow for more efficient cooling of the electronics. With respect to the aisle limitation, Dearborn teaches (In Fig 5) a plurality of rack structures (150a, 150b) arranged to form a pair of rows on each side of a central aisle, a plurality of computer boards accessible through at least one of the open first and

second sides through the central aisle (See Fig 5). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Dearborn with that of Chu, such that there are multiple racks (As the one shown in Chu Fig 11b) located in a pair to form a central aisle and wherein the boards are accessible via the aisle since doing so will, predictably, provide for a single data center with adequate room to maintain and cool the racks.

With respect to claim 35, Chu further teaches that the one or more cooling coils (21) are positioned immediately adjacent to the plurality of circulation fans (11).

With respect to claim 36, Chu in view of Beitelmal and Dearborn further teaches that each rack structure having associated air fans (11), cooling coils (21), and fan controllers (As per the teachings of Beitelmal), and wherein the pair of rows is arranged on each side of the central aisle (See Dearborn Fig 5), the central aisle disposed lengthwise in a container (I.E. room 140 of Dearborn) that houses the plurality of rack structures, the cooling coils located on sides of the rack structures away from the aisle and near outside walls of the container (It is obvious to place the rack as taught by Chu into an aisle as taught by Dearborn such that the cooling coils are located on sides of the rack structure away from the aisle and near outside walls of the container as claimed).

With respect to claim 38, Chu in view of Beitelmal teach the limitations of claim 34 as per above however the embodiment disclosed in Fig 11a of Chu fails to specifically teach or suggest a separate cooling coil for each computer in a rack of computers. However, the embodiment disclosed in Fig 8a of Chu clearly discloses the

limitations of claim 38. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of the embodiment in Fig 8a with the embodiment of Fig 11a of Chu since if a particular drawer to be pulled or removed from the electronics frame only the corresponding heat exchanger associated with that drawer need to be repositioned [0045].

With respect to claim 39, Chu in view of Beitelmal teach the limitations of claim 38 as per above and further teaches that the air circulation fans (11) are matched to a space between adjacent boards but fails to specifically teach or suggest that the boards are mounted horizontally on shelves of the rack structure as claimed. The Examiner hereby takes Official Notice of the conventionality of mounting boards with or without containers (12/13 as per Chu) on shelves within a rack structure. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings as per the Official Notice above with that of Chu and Beitelmal since shelving provides support and structural integrity to the rack of Chu.

With respect to claim 44, Chu further teaches that the open back side of each frame structure is adjacent an exterior wall (That which is connected to 81 as per Fig 11a) of a container that holds the rows of computer racks and the one or more cooling coils (21) located between the open back side and the exterior wall of the container (See Fig 11a).

With respect to claim 45, Chu further teaches that the racks extend substantially the length of the container (See Fig 11b).

With respect to method claims 49-50, 52 the method steps recited in the claims are inherently necessitated by the device structure as taught by the Chu, Beitelmal, and Dearborn references as per the rejections above.

**7. Claims 37, 46, and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu in view of Beitelmal in view of Dearborn and further in view of Rumbut, Jr. (US 5,740,018 – hereinafter, “Rumbut”)**

With respect to claims 37 and 46, Chu in view of Beitelmal and Dearborn teach the limitations of claims 36 and 43 as per above but fails to teach or suggest the limitations of claims 37 or 46. Rumbut teaches a cooling module (250) outside of a container (200) which fluidly connects to cooling coils. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Rumbut as per above with that of Chu to provide a device which will remove heat from the fluid and thus allow the heat to be moved from the rack structure to an external area.

With respect to method claim 51, the method steps recited in the claims are inherently necessitated by the device structure as taught by the Chu, Beitelmal, Dearborn and Rumbut references as per the rejection above.

**8. Claims 41 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu in view of Beitelmal in view of Dearborn and further in view of Laffranchi (US 3,889,746).**



With respect to claims 41 and 47, Chu in view of Beitelmal and Dearborn teach the limitations of claims 34 and 43 as per above but fails to teach or suggest the limitations of claims 41 or 47. Lafranchi, however, teaches one or more cooling coils include coolant conduits having an external member and an inner baffle defining an annular channel therebetween and through which a cooling liquid flows (See, Abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Lafranchi with that of Chu, Beitelmal and Dearborn to provide for a smooth continuation of flow in the pipe line (Col 1, Line 67 – Col 2, Line 1).

**9. Claims 42, 48 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu in view of Beitelmal in view of Dearborn and further in view of Etter (US 6,407,567).**

With respect to claims 42 and 48, Chu in view of Beitelmal and Dearborn teach the limitations of claims 34 and 43 as per above but fails to teach or suggest the limitations of claims 42 and 48. Etter, however, teaches individually controlling fans to provide the appropriate air flow rate for an individual heat generating device (Col 3, Lines 28-33). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Etter with that of Chu, Beitelmal and Dearborn to provide for a more efficient cooling apparatus (I.E. having fans provide only enough airflow that is necessary reduces power consumption).

With respect to method claims 55, the method steps recited in the claims are inherently necessitated by the device structure as taught by the Chu, Beitelmal and Etter references as per the rejection above.

**10. Claim 53 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chu in view of Beitelmal in view of Dearborn and further in view of Takahashi et al. (US 6,530,347 - hereinafter, "Takahashi").**

With respect to claim 53, Chu in view of Beitelmal and Dearborn teaches the limitations of claim 48 as per the rejection above and Beitelmal further teaches the conventionality of having a valve (42) which controls a fluid flow. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Beitelmal as per above with that of Chu to provide for a means to control the fluid flow through the coils of Chu.

With respect to the remaining limitations of claim 53, Chu in view of Beitelmal fails to teach or suggest the remaining limitations. Takahashi, however, teaches modulating a cooling liquid to the cooling coils through a valve; and controlling the valve according to at least one of a temperature and a pressure of the cooling fluid (Col 8, Lines 18-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Takahashi with that of Chu, Beitelmal, and Dearborn to prevent damage to the electrical components by assuring that there is enough coolant at the proper temperature to provide adequate cooling (Takahashi, Col 1, Lines 30-33).

**11. Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chu in view of Beitelmal in view of Dearborn in view of Takahashi and further in view of Laffranchi.**

With respect to claim 54, Chu, Beitelmal, Dearborn and Takahashi all teach the limitations of claim 52 as per above but fail to teach the limitations of claim 54. Laffranchi teaches the limitations of claim 53 as per the rejection to claims 41 and 46. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Laffranchi with that of Chu, Beitelmal, Dearborn and Takahashi to provide for a smooth continuation of flow in the pipe line (Col 1, Line 67 – Col 2, Line 1).

**12. Claim 56 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chu in view of Beitelmal in view of Dearborn and further in view of Patel et al. (US 2003/0147214 – hereinafter, “Patel”).**

With respect to claim 56, Chu in view of Beitelmal and Dearborn teaches the limitations of claim 34 as per above but fails to specifically teach or suggest the limitations of claim 56. Patel, however, teaches a controller (90) used to regulate both a valve (which supplies liquid coolant to cool an electronic device) and a fan (see [0029] and [0056]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Patel with that of Chu, Beitelmal and

Dearborn to provide optimized cooling and efficiency of the cooling system of Chu (see Patel [0056]).

### ***Conclusion***

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ZACHARY M. PAPE whose telephone number is (571)272-2201. The examiner can normally be reached on Mon.- Fri. 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jayprakash Gandhi can be reached on 571-272-3740. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Zachary M Pape/

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